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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/707,907
Filing Date: January 23, 2004
Appellant(s): SELLERS, MICHAEL BEN

John F. Buckert (44,572)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06/03/2009 appealing from the Office action mailed 04/15/2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,642,717	DIETZ	11-2003
2004/0225213	WANG	11-2004
5530355	DOTY	6-1996

5,235,283 LEHNE 8-1993

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

4. Claims 1-2, 6-7, 12-15,17-18, 21-22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. (USPN 6,642,717) in view of Wang et al. (Pub. No.: 2004/0225213).

5. Dietz et al. '717 teaches a gradient tube extending along an axis, the tube including first and second gradient coils (abstract; col. 2, l. 35- col. 3, l. 30) and a conductive compound disposed between the first and second gradient coils (col. 2, ll. 36-67; Figure, ref. 34), the conductive compound being an epoxy resin or glue having a plurality of conductive particles and a chemical hardening compound therein (col. 2, ll. 56-col. 3, l. 10; col. 3, ll. 43-55), and a plurality of conductive particles 38 disposed substantially uniformly within the resin or glue (col. 3, ll. 11-29), at least a portion of the plurality of conductive particles being in the range of 1-10 micrometers in diameter configured to limit a current flowing through the device (col. 3, ll. 26-30; claim 5). Regarding the limitation including 10 microamps, the Examiner stands that Applicant has not disclosed any particular criticality of the 10 microamp limit. Therefore, absent any criticality, the limit "less than 10 microamps" is not given patentable weight over Dietz et al. '717 because both Dietz et al. '717 and the present application are concerned with limiting current.

6. Dietz et al. '717 teaches all the limitations of the claimed invention except for expressly teaching that the glue comprises a polyester resin. Dietz et al. '717 also does not expressly teach the use of silver or gold particles. Dietz et al. '717 also does not expressly teach that the volume percentage of the plurality of conductive particles is 0.1% or less of a volume of the conductive compound.

7. In the same field of endeavor, Wang et al. '213 teaches a MRI coated assembly (abstract). Wang et al. '213 goes on, teaching as known in the art using a polyester compound in a glue [0242]. Wang et al. 213 also teaches the use of ferromagnetic particles embedded in a resinous material at a concentration of about 0.001% to about 10% [0010]. Wang et al. '213 further teaches the use of electrically conductive particles including silver or gold [0206].

8. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coated gradient coils of Dietz et al. '717 in view of the coatings of Wang et al. '213. The motivation to modify Dietz et al. '717 in view of Wang et al. '213 would have been to select any resin mixture from a finite list of well known resin mixtures commonly used in the art to be used with MRI with reasonable expectations of success, as taught by Wang et al. '213 [0242].

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. (USPN 6,642,717) in view of Wang et al. (Pub. No.: 2004/0225213) as applied to claim 1 above, and further in view of Doty (USPN 5,530,355).

10. Dietz et al. '717 in view of Wang et al. '213 teaches all the limitations of the claimed invention except for expressly teaching that the conductive particles comprise carbon particles.

11. In the same field of endeavor, Doty '355 teaches using carbon particles in a shielded coil system (col. 14, l. 57- col. 15, l. 13).

12. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coated gradient coils of Dietz et al. '717 in view of Wang et al. '213 with the use of carbon particles of Doty '355. The motivation to modify Dietz et al. '717 in view of Wang et al. '213 with Doty '355 would have been to aid in casting or curing, as taught by Doty '355 (col. 14, l. 57- col. 15, l. 13).

13. Claims 5 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz et al. (USPN 6,642,717) in view of Wang et al. (Pub. No.: 2004/0225213) as applied to claims 2 and 22 above, and further in view of Lehne et al. (USPN 5,235,283).

14. Dietz et al. '717 in view of Wang et al. '213 teaches all the limitations of the claimed invention except for expressly teaching that the epoxy resin comprises a bisphenol-A resin.

15. In the same field of endeavor, Lehne et al. '283 teaches using bisphenol-A resin in an epoxy resin (col. 4, ll. 39-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coated gradient coils of Dietz et al. '717 in view of Wang et al. '213 with the bisphenol-A resin of Lehne et al. '283. The motivation to modify Dietz et al. '717 in

view of Wang et al. '213 with Lehne et al. '283 would have been to aid in casting or curing, as taught by Lehne et al. '283 (col. 4, ll. 39-58).

(10) Response to Argument

A.

1. Responding to Appellant's argument that the Examiner's rejection of claims 1, 2, 6, 7, 12-15, 17, 18, 21, 22 and 24 is improper under 35 USC because the Examiner allegedly has not identified any proper motivation for the proposed combination of Dietz et al. and Wang et al, the Examiner maintains that the motivation to combine Dietz in view of Wang is obvious because Dietz, the primary reference, explicitly discloses altering the electrical conductivity by altering the composition of the conductive filler in an MRI gradient coil assembly (Dietz: col. 3, ll. 22-30). Here, Dietz teaches that a certain degree of electrical conductivity can be tolerated through the use of particulate metals such as aluminum, copper or brass. That is, Dietz teaches the optimization of a conductive compound by varying the particulate conductive filler. However, Dietz does not expressly teach the particular conductivity achieved by the specific concentration. The secondary reference, Wang teaches that such a low concentration of particulate filler is known (Wang: 0010). Furthermore, Wang teaches that it is known to limit the conductivity using lower concentrations or to vary the concentration to optimize it's performance (0062, 0069; 0085; 0112; 0136; 0162-0164; 0228; 0255; 0301). Thus, the motivation to modify Dietz in view of Wang would have been achieve a lower

conductivity by optimizing the composition of Dietz with the lower concentration ranges of Wang.

Appellant goes on, alleging that Wang is not a viable reference to modify Dietz, because Wang "is directed to an implanted medical device". However, Wang expressly discloses the mitigation of a device's thermal and electrical conductivity, which are related by the generation of Eddy currents when in the presence of a magnetic field (Wang: 0122). That is to say, that both Dietz and Wang address the same problem, the generation of heat thru electrical conduction, by using a coating which controls thermal and electrical conduction (see Dietz: col. 2, ll. 20-24, col. 3, ll. 16-30 and Wang: 0010, 0122; 0162-0164).

Appellant goes on further, alleging that "neither reference recognizes the problem being solved by the claimed invention." In particular, alleging that neither reference "recognizes that high-voltage potentials induced in a resin between first and second gradient coils can undesirably cause electrostatic discharges...within the resin...". Looking to the Independent claims, the subject matter explicitly claims that a volume percentage of plurality of conductive particles is 0.1% or less of the volume of conductive compound *such that* a current flowing through the conductive compound is limited to less than 10 microamps to reduce electrostatic discharges in the glue. Here, the Examiner stands that composition set forth by Dietz in view of Wang, teaches as known, adding particulate conductive particles to a conductive particles for the purpose of limiting electrical and thermal current, and thus reducing electrical discharge (see for example: Wang 0164).

2. Regarding the 103(a) rejection of claims 1, 2, 6, 7, 13-15, 17 and 18, Appellant alleges that Dietz and Wang alone or in combination do not teach or suggest every limitation of the claims. Here, Appellant looks to claim 1, "a volume percentage of the plurality of conductive particles is 0.1% or less of a volume of the conductive compound such that current flowing through the conductive compound is limited to less than 10 microamps to reduce electrostatic discharges in the glue." Appellant alleges that Dietz does not teach or suggest the above limitation. Appellant further alleges that the Examiners position that less than 10 microamps is not given patentable weight over Dietz because both Dietz and present application are concerned with limiting current. Here it is stressed that, the limitation "a volume percentage of the plurality of conductive particles is 0.1% *or less* of a volume of the conductive compound such that current flowing through the conductive compound is limited to *less than* 10 microamps to reduce electrostatic discharges in the glue", includes conductive compounds having conductive particles in the volume percent range of 0%-0.1% of a volume conductive compounds such that the current of the conductive compound is 0-10 microamps. However, Dietz's tolerance for a certain degree of electrical conductivity, which is disclosed as being for employment in a magnetic resonance apparatus, is achieved by the use of low electrically conductive particles or particulate conductive particles (col. 3, ll. 16-29). The previous office action repeatedly maintains that the combination of Dietz and Wang teach the presently claimed conductive compound (i.e. the glue {Wang: 0242}, the chemical hardening compound {Dietz: col. 2, ll. 56-col. 3, l. 10; col. 3, ll. 43-

55}, the plurality of conductive particles of 1-10 micrometer diameter configured to limit current {Dietz: col. 3, ll. 26-30; claim 5}). Furthermore, the combination teaches as known optimizing particulate conductive particles concentration in a conductive compound for the purpose of limiting or tempering electrical and thermal current, and thus reducing electrical discharge (see for example: Dietz: col. 3, ll. 16-29 or Wang: 0010, 0164). Wang even teaches as known the use of a conductive compound at .001% by weight of a material (Wang: 0010).

Appellant further alleges that Wang does not teach or suggest "a volume percentage of conductive particles is 0.1% or less of a volume of the conductive compound such that the current flowing through the conductive compound is limited to less than 10 microamps to reduce electrostatic discharges in the glue". Specifically, Appellant alleges that Wang discloses a concentration of about 0.001% to about 10% by weight of the material. That is, it appears that Appellant's alleges that the claimed volume percentage is patentably distinct from weight percentage, as understood by Appellant from Wang 0010. However, the Examiner maintains that the claim language and the specification is vague in defining the criticality of "a volume percentage of conductive particles is 0.1% such that the current flowing through the compound is limited to less than 10 microamps". Here, it appears that there is direct relationship between the conductive particles and current flow. That is to say, it is not made clear by the claim language or specification why it would not be obvious to achieve 0 microamp current flow through a compound (corresponding to the claimed less than 10 microamps) by reducing a conductive particle volume concentration to 0%

(corresponding to 0.1% or less of a volume) when all other elements in the conductive compound are equal. Therefore, Appellants do not address why a volume percent of a conductive particle less than 0.1% is critical to achieving less than 10microamp current flow-through and therefore patentably distinct from references that teach; 1) varying a conductive particle concentration to achieve reduced current flow-through, 2) compounds with no conductive particles that have no current flow-through, and 3) as known that conductors causing induction loops or eddy currents, may be used magnetic environments when in concentrations of 0.001% to about 10% by weight. Looking to the present specification, the Examiner finds the passage:

The volume percentage of conductive particles to resin plus hardener is preferably 0.1% or less of conductive particle volume to 99.0% or greater of resin plus hardener volume. The conductive compound layers 30,32 preferably limit a current flowing through layers 30,32 to less then 10 microamps (Present Application: 0020).

This passage provides no indication of a criticality of the volume percentage of the conductive particles to "preferably" limit a current to less than 10microamps. Therefore, the examiner maintains the grounds that Dietz in view of Wang teach the above alleged deficiency because the combination teaches as known optimizing particulate conductive particles concentration in a conductive compound for the purpose of limiting or tempering electrical and thermal current, and thus reducing electrical discharge (see for example: Dietz: col. 3, ll. 16-29 or Wang: 0010; 0164). See *In re Aller,* 220 F.2d 454,456, 105 USPQ 233,235 (CCPA 1969).

3. Regarding the rejection of claim 12, the Appellant alleges that Dietz in view of Wang alone or in combination, do not teach or suggest every limitation of the claim. Here, Appellant alleges that the limitation, "the potting compound layer having a plurality of conductive particles configured to limit a current flowing through the to less than a predetermined current value to reduce electrostatic discharges in the potting compound layer, the plurality of conductive particles being at least one of silver and gold particles" distinguishes the claim over the prior art. Appellant alleges that Dietz does not teach utilizing silver and gold particles in a potting compound layer. Here, the Examiner had relied on paragraph 0020 of the present specification that gives an example of a potting compound. Here a potting compound is described as a glue such as epoxy and a chemical hardener. The previous office action repeatedly maintains that the combination of Dietz and Wang teach the presently claimed potting compound (i.e. the glue {Wang: 0242}, the chemical hardening compound {Dietz: col. 2, ll. 56-col. 3, l. 10; col. 3, ll. 43-55}, the plurality of conductive particles of 1-10 micrometer diameter configured to limit current {Dietz: col. 3, ll. 26-30; claim 5}). Regarding the silver or gold particle limitation, the previous office action repeatedly maintains that the combination of Dietz and Wang teaches the use of gold or silver particles (see Wang: 0322; 0338).

Applicant further alleges that Wang refers to a resinous material in an *implantable device*, not a gradient coil assembly. However, the Examiner maintains that the motivation to combine Dietz in view of Wang is obvious because Dietz, the primary reference, explicitly discloses altering the electrical conductivity by altering the composition of the conductive filler within an MRI gradient coil assembly (Dietz: col. 3, ll.

22-30). Here, Dietz teaches that a certain degree of electrical conductivity can be tolerated through the use of particulate metals such as aluminum, copper or brass. That is, Dietz teaches the optimization of the particulate conductive filler. However, Dietz does not expressly teach the use of silver or gold particles. The secondary reference, Wang teaches the use of silver or gold particles in a current limiting compound (Wang: 0322; 0338). Furthermore, Wang teaches that it is known to limit the conductivity using lower concentrations or to vary the concentration to optimize it's performance (0062, 0069; 0085; 0112; 0136; 0162-0164; 0228; 0255; 0301). Thus, the motivation to modify Dietz in view of Wang would have been to achieve a lower conductivity by optimizing the composition of Dietz with the lower concentration ranges of Wang.

4. Regarding the rejection of claim 21, the Appellant alleges that Dietz in view of Wang alone or in combination, do not teach or suggest every limitation of the claim. Here, the Appellant alleges that the limitation "a volume percentage of the plurality of conductive particles being within a predetermined volume percentage range of the conductive compound such that a current flowing through the conductive compound is less than 10 microamps to reduce electrostatic discharges in the glue" is sufficient to overcome the prior art. Looking to the present specification (0020), the Examiner finds that a predetermined volume percentage range would be "The volume percentage of conductive particles to resin plus hardener is preferably 0.1% or less of conductive particle volume to 99.0% or greater of resin plus hardener volume". That is to say, it appears that a volume percentage within the range of 0% to 100% would fall within in

the predetermined range. This passage provides no indication of a criticality of the volume percentage of the conductive particles to "preferably" limit a current to less than 10microamps. Therefore, the Examiner maintains the grounds that Dietz in view of Wang teach the above alleged deficiency because the combination teaches as known optimizing particulate conductive particles concentration in a conductive compound for the purpose of limiting or tempering electrical and thermal current, and thus reducing electrical discharge (see for example: Dietz: col. 3, ll. 16-29 or Wang: 0164). See *In re Aller,* 220 F.2d 454,456, 105 USPQ 233,235 (CCPA 1969). For further support, see Part **A.** section **2.**

B.

1. Responding to Appellant's argument the Examiner's rejection of claim 3 is improper under 35 USC because the Examiner allegedly has not identified any proper motivation for the proposed combination of Dietz et al. and Wang et al. and Doty et al., the Examiner maintains that the motivation to combine Dietz in view of Wang is obvious because Dietz, the primary reference, explicitly discloses altering the electrical conductivity by altering the composition of the conductive filler in an MRI gradient coil assembly (Dietz: col. 3, ll. 22-30). Here, Dietz teaches that a certain degree of electrical conductivity can be tolerated through the use of particulate metals such as aluminum, copper or brass. That is, Dietz teaches the optimization of the particulate conductive filler. However, Dietz does not expressly teach the particular conductivity achieved by the specific concentration. The secondary reference, Wang teaches that such a low

concentration of particulate filler is known (Wang: 0010). Furthermore, Wang teaches that it is known to limit the conductivity using lower concentrations or to vary the concentration to optimize it's performance (0062, 0069; 0085; 0112; 0136; 0162-0164; 0228; 0255; 0301). Thus, the motivation to modify Dietz in view of Wang is would have been to achieve a lower conductivity by optimizing the composition of Dietz with the lower concentration ranges of Wang. Furthermore, the motivation to modify Dietz in view of Wang with the carbon particles of Doty is obvious because Doty is in the same field of endeavor, teaching limiting eddy current loss through a resin in an MRI assembly (Doty: col. 15, ll. 5-13). The motivation to modify Dietz in view of Wang and Doty would have been to aid in casting or curing of the MRI assembly or to achieve a desirable material property, as taught by Doty (col. 14, l. 57- col. 15, l. 13).

2. Appellant further alleges that the rejection of claim 23 is improper because Dietz Wang, and Doty, alone or in combination do not teach or suggest each and every limitation of the claim. That is, Appellant alleges that Doty does not cure the alleged deficiencies of claim 1, "a volume percentage of the plurality of conductive particles is 0.1% or less of a volume of the conductive compound such that current flowing through the conductive compound is limited to less than 10 microamps to reduce electrostatic discharges in the glue." The Examiner stands that the combination of Dietz in view of Wang teaches the alleged deficiency. See part **A.** section **2.**

C.

1. Responding to Appellant's argument the Examiner's rejection of claims 5 and 23 is improper under 35 USC because the Examiner allegedly has not identified any proper motivation for the proposed combination of Dietz et al. and Wang et al. and Lehne et al., the Examiner maintains that the motivation to combine Dietz in view of Wang is obvious because Dietz, the primary reference, explicitly discloses altering the electrical conductivity by altering the composition of the conductive filler in a MRI gradient coil assembly (Dietz: col. 3, ll. 22-30). Here, Dietz teaches that a certain degree of electrical conductivity can be tolerated through the use of particulate metals such as aluminum, copper or brass. That is, Dietz teaches the optimization of the particulate conductive filler. However, Dietz does not expressly teach the particular conductivity achieved by the specific concentration. The secondary reference, Wang teaches that such a low concentration of particulate filler is known (Wang: 0010). Furthermore, Wang teaches that it is known to limit the conductivity using lower concentrations or to vary the concentration to optimize it's performance (0062, 0069; 0085; 0112; 0136; 0162-0164; 0228; 0255; 0301). Thus, the motivation to modify Dietz in view of Wang would have been achieve a lower conductivity by optimizing the composition of Dietz with the lower concentration ranges of Wang. Furthermore, the motivation to modify Dietz in view of Wang with the bisphenol-A resin in an epoxy resin of Lehne et al. is obvious because Lehne is in the same field of endeavor, MRI gradient coil assemblies with the use of epoxy resins having reduced current flow-through (Lehne: abstract, col. 5, ll. 31-36). The motivation to modify Dietz in view of Wang and Lehne would have been to aid in casting or curing, as taught by Lehne (Lehne: col. 4, ll. 39-58).

2. Appellant further alleges that the rejection of claim 23 is improper because Dietz Wang, and Lehne, alone or in combination do not teach or suggest each and every limitation of the claim. That is, Appellant alleges that Lehne does not cure the alleged deficiencies of claim 1, "a volume percentage of the plurality of conductive particles is 0.1% or less of a volume of the conductive compound such that current flowing through the conductive compound is limited to less than 10 microamps to reduce electrostatic discharges in the glue.". However, the Examiner stands that the combination of Dietz in view of Wang teaches the alleged deficiency. See section **A.** part **2.**

3. Appellant further alleges that the rejection of claim 23 is improper because Dietz Wang, and Lehne, alone or in combination do not teach or suggest each and every limitation of the claim. That is, Appellant alleges that Lehne does not cure the alleged deficiencies of claim 21, "a volume percentage of the plurality of conductive particles being within a predetermined volume percentage range of the conductive compound such that current flowing through the conductive compound is limited to less than 10 microamps to reduce electrostatic discharges in the glue." However, the Examiner stands that the combination of Dietz in view of Wang teaches the alleged deficiency. See section **A.** part **4.**

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Ellsworth Weatherby/

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